~~CLAIMS~~ WHAT IS CLAIMED IS:

1. Device for the injection of gas bubbles into a liquid metal (3, 23) contained in a treatment volume, preferably a treatment tank, a liquid metal circulation chute or a furnace, the said device comprising at least one static injection part (1, 21) made of an inert material, the said static part (1, 21) comprising a plurality of orifices (2, 22), the said device being characterised in that the material and/or layout of the orifices are such that the ratio of the diameter of the contact area between each emitted bubble and the said material at the exit from the orifice (2, 22), to the ~~diameter of the orifice, or the~~ spreading ratio, is less than 5, preferably less than 3, or more preferably less than 1.5.

2. Device according to claim 1, characterised in that the spreading ratio is obtained using a static part (1, 21) made by a material that is wettable by the liquid metal (3, 23).

3. Device according to claim 2, characterised in that when the liquid metal (3, 23) is aluminium, magnesium or their alloys, the wettable material is chosen among refractory metals such as W, Mo, Ti, V, Cr, Fe or steels or their alloys, or among refractory ceramics such as TiB_2, nitrides (AlN, BN) or carbides (Al_4C_3, TiC_{1-x})

4. Device according to claim 2 or 3, characterised in that the orifices are located at the top of tapered protuberances.

5. Device according to any one of claims 1 to 4, characterised in that the spreading ratio is obtained

by mechanically or geometrically limiting the said contact area.

6. Device according to claim 5, characterised in that, so as to geometrically limit the contact area, the orifices (2, 22) are located at the top of protuberances (32) located on the static part (1, 21).

7. Device according to claim 5 or 6, characterised in that when the material used for the static part (21) is non wettable, each protuberance (32) comprises only one gas emission orifice (22).

8. Device according to claim 6 or 7, characterised in that at least one of the protuberances (32) is removable.

9. Device according to any one of claims 1 to 8, characterised in that it comprises means such that the gas pressure at the outlet orifice is approximately constant, regardless of the gas flow.

10. Device according to claim 9, characterised in that the said means comprise the smallest possible buffer volume between the gas outlet orifice and the closest gas supply adjustment device and/or an appropriate mass flow meter and/or a porous means introducing a local pressure head loss just on the upstream side of the gas outlet orifice.

11. Device according to any one of claims 1 to 10, characterised in that a shearing energy is added to the liquid metal (3, 23) preferably by means of ultrasounds or a rotary stirrer.

12. Device according to any one of claims 1 to 11, characterised in that the orifices (2, 22) are separated from each other by a distance such that the bubbles do not come into contact while they are being formed.

13. Device according to any one of claims 1 to 12, characterised in that the static injection part (1, 21) is made of one or several elements assembled together.

14. Process for treatment of a liquid metal (3, 23) by injection of a gas using a static gas injection device (1, 21) according to any one of claims 1 to 13, characterised in that the diameter of the bubbles (11, 31) of the treatment gas introduced into the liquid metal (3, 23) is smaller than 20 mm and preferably smaller than 10 mm, with the liquid metal (3, 23) being at rest.

15. Process for the treatment of a liquid metal (3, 23) by injection of a gas, making use of the static gas injection device according to any one of claims 1 to 13.

16. Treatment process according to either of claims 14 and 15, characterised in that the bubble size (11, 31) is measured using a method consisting of irradiating the liquid metal bath (3, 23) into which the bubbles are emitted using X-rays, displaying the said bubbles after the image has been retrieved by a camera, and measuring them after calibration of the acquisition system.